LOCK PICK
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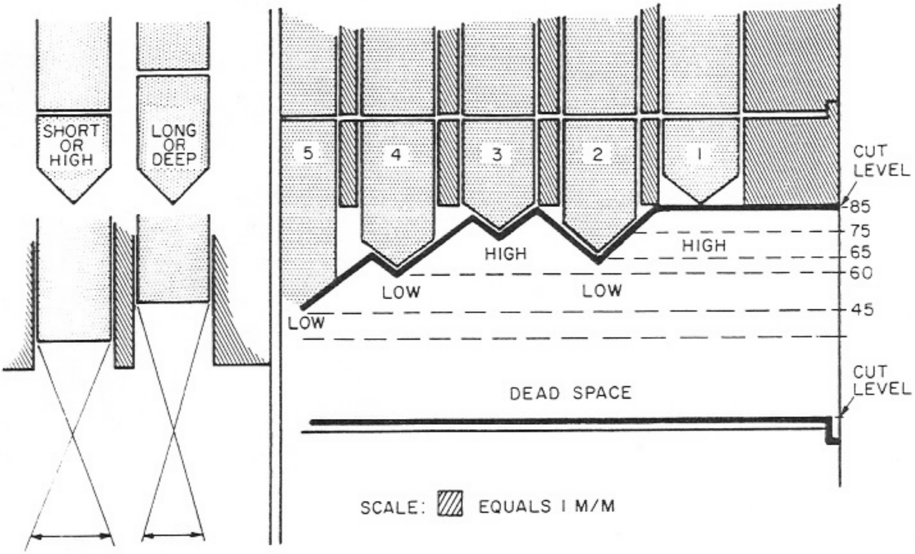
PIN TUMBLER LOCKS

In explaining the SAK System for pin tumbler locks, keep in mind that most all figures indicated are arbitrary, and that they are given only to illustrate the point in question. For instance, the distance shown in this explanation between the top and bottom of the keyway will be 8.5 mm.—this figure will be given as 85. Naturally, this distance varies according to the manufacturer of the lock as in the Evva, its 87; in the Zeus, its 84.

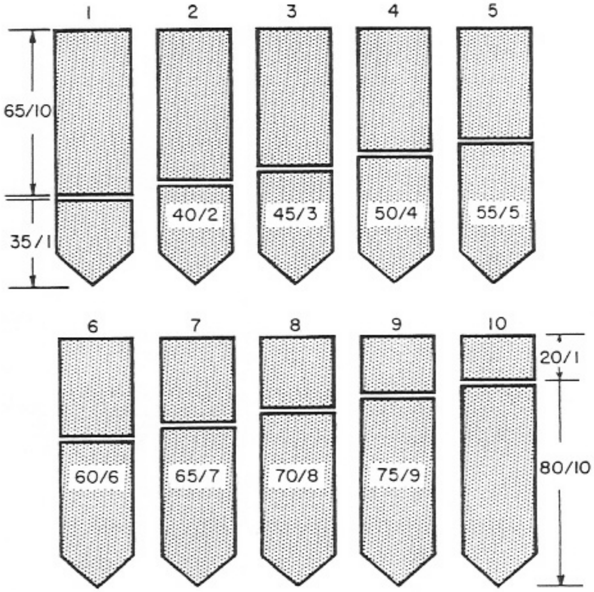
SAK believes that the best pin tumbler lock in the world is the Yale, and he insists that most all other lock manufacturers copy the features of the Yale locks. You will therefore determine, after you have broken down several Yale locks, that figures shown in this explanation come close to those of the Yale pin tumbler lock. No doubt, this admiration that SAK has for the Yale locks has led him to use it and its measurements as the base for his theory system.

So—let's begin with a rule or two:

1. The longer the pin, the less the wiggle—the shorter the pin, the greater the wiggle . . .
2. In the key, the high cuts take the short pins, and the deep cuts take the long pins . . .
3. The pins are numbered from 1 to 5, running from front to back . . .
4. The dead space in the keyhole is usually 3.5 mm. . . .



Now, before we take up what constitutes a high or low pin or cut, let's first assume that there are only 10 sizes in the length of the upper and lower pins—as follows:

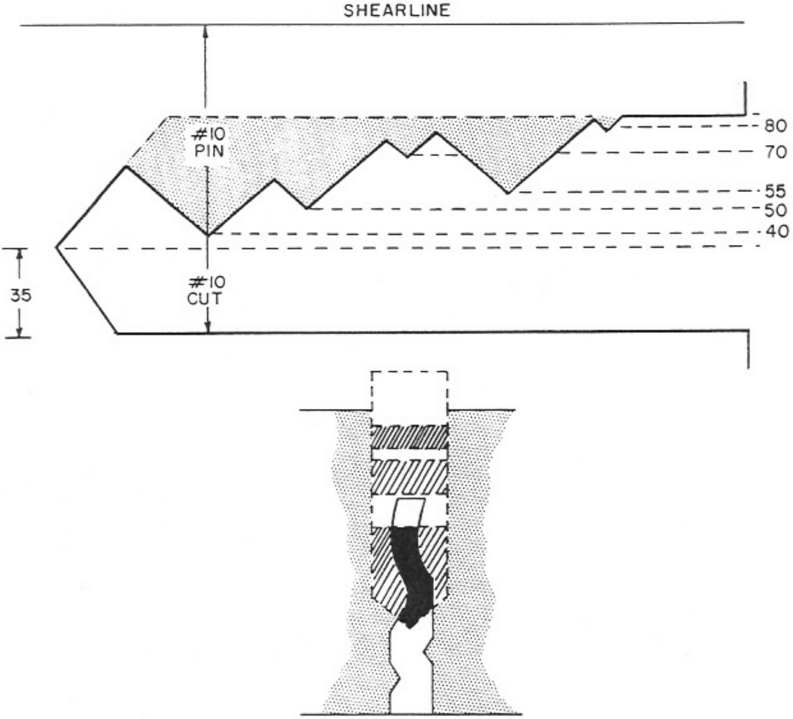


Simple arithmetic will now introduce your highs and lows, for example—the keyway is 85, the first diagram shows number one pin to be sitting upon the key which has no cut since the distance from the key top to the shearline is the exact length of the number one lower pin—number two pin has a cut in the key of 20, so the lower pin will be 55 long (65 plus 55 makes 120 from key bottom to the shearline).

Now, let's figure backwards towards the highs and lows—begin at the dead space line. When the key is not in the lock, all the pins will fall to the dead space line. Number one lower pin length is 35 plus the 35 of dead space makes 70—number two lower pin length is 40 plus the 35 of dead space makes 75—number 3 lower pin length is 45 plus the 35 of dead space makes 80—number 4 lower pin length is 50 plus the 35 of dead space makes 85 . . .

Therefore, the shearline of lower pins 1, 2, 3, and 4 can be seen through the keyhole if they are in the number one pin position. These four pins constitute the highs while all other pins make up the lows since you since you cannot see their shearlines (they will be above the keyhole height of 85—35 dead space plus the 55 length of number 5 pin makes 90 or 05 too high to be seen through the keyhole).

Another example of what is meant by highs and lows appears in the following diagram in which we will use all the key cuts and lower pin lengths not previously shown:



High key cut 85 plus lower pin length 35 equals shearline of 120.
High key cut 80 plus lower pin length 40 equals shearline of 120.
High key cut 75 plus lower pin length 45 equals shearline of 120.
High key cut 70 plus lower pin length 50 equals shearline of 120.
Low key cut 65 plus lower pin length 55 equals shearline of 120.
Low key cut 60 plus lower pin length 60 equals shearline of 120.
Low key cut 55 plus lower pin length 65 equals shearline of 120.
Low key cut 50 plus lower pin length 70 equals shearline of 120.
Low key cut 45 plus lower pin length 75 equals shearline of 120.
Low key cut 40 plus lower pin length 80 equals shearline of 120.

Now let's leave the field of theory and apply what we have learned up to this point. Let's determine how many highs the Evva lock has . . .

The Evva key base is 86.5 to 87 from top to bottom—let's use 87 . . . Our dismantling and measurement of all the parts necessary to determine the highs and lows reflect that there are ten key cuts and ten sizes in the lower pin lengths—the dead space is 35, and the lowest point of fall for all the pins is 50 from the key top. So, 87 minus 50 leaves 37 or 02 difference between the dead space and the lowest key cut. Our charting of the different pins taken from 10 Evva locks reveal that the longest lower pin length found, to be 90—so, 90 plus 37 equals 127. The diameter of the plug is 128—so, 127 from 128 leaves 01 which is the manufacturers imposed tolerance . . .

Key Cuts	Lower Pin Length	Number
37	90	10
42	85	9
47	80	8
52	75	7
57	70	6
62	65	5
67	60	4
72	55	3
77	50	2
82	45	1

With the complete relationship now determined, the first high should then be number 1—35 dead space plus 45 lower pin length equals 80—second high is 2—35 dead space plus 50 lower pin length equals 85. If you take number 3 and do the same as number 1 and 2, you arrive at 90 which is 03 higher than 87, and therefore, the shearline is not to be seen. . . .

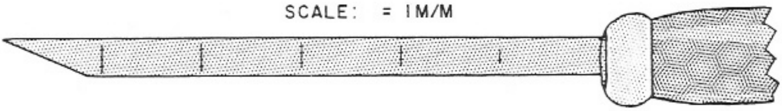
So, the Evva has only 2 highs, BUT, number three can be seen if it is in the number one position—why this is, is not known, and even SAK appeared mystified about this point.

The Zeus lock is especially confusing in this regard, for you will be able, now and then, to probe a number three high in number two, three, four, and five pin positions.

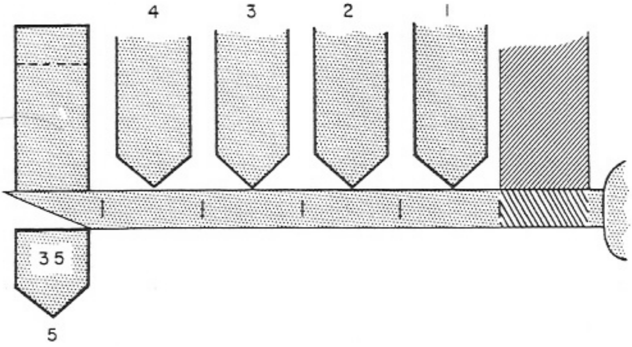
Tolerances must be the answer either imposed or acquired . . .

Before going on to the probe and for the make of contrast between our best examples and the Evva, let's add the measurements of the Zeus lock. The base of the Zeus key is 87, and the diameter of the plug is 129. There are 10 key cuts of 84, 79, 74, 69, 64, 59, 54, 49, 44, 39—and 10 lower pin lengths of 44, 49, 54, 59, 64, 69, 74, 79, 84, 89 which all total 128 for a 01 imposed tolerance. The lowest point of pin fall is 50, and the dead space is 35. Once again we have two definite highs, and probably a third . . .

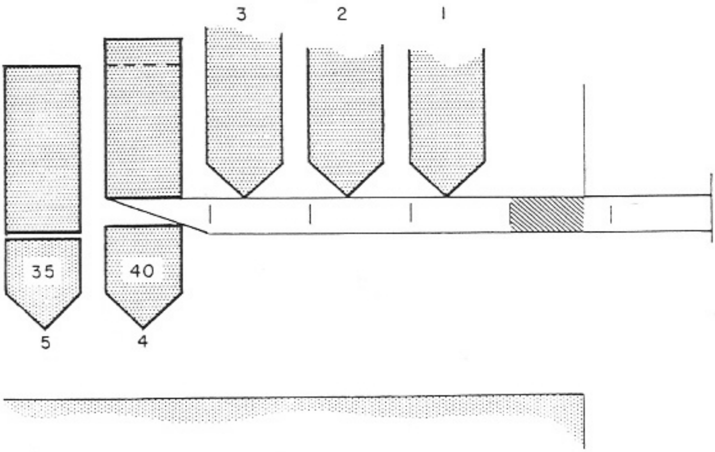
SAK probes most every lock before attempting to pick it, and the tool he uses is shown below:



This tool is used in the following manner from back to front (we will return to our original example, and use four highs in four pins):

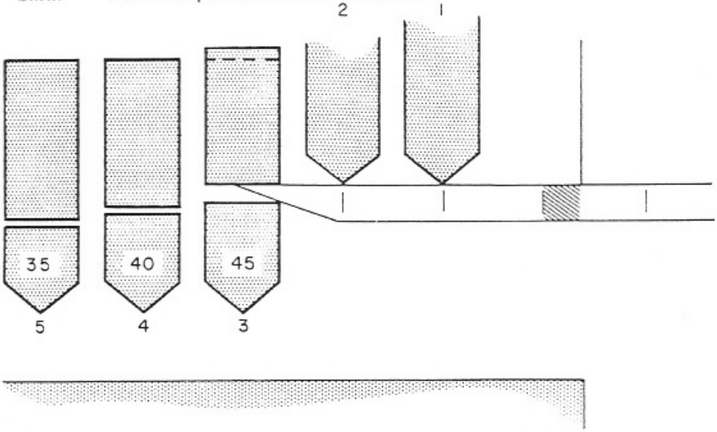


First	Run probe into keyway and compress all pins.
Second	Back off probe until 5 falls free, but keep probe up against the forward side of 5. Notice mark position.
Third	Probe carefully for a shearline, and when it is located, drive probe in as far as it will go. Notice marks.
Fourth	Withdraw probe and let 4 fall free . . .



Fifth Probe for shearline, and if it is located, insert probe in as far as it will go. Notice marks.

Sixth Withdraw probe and let 3 fall free . . .

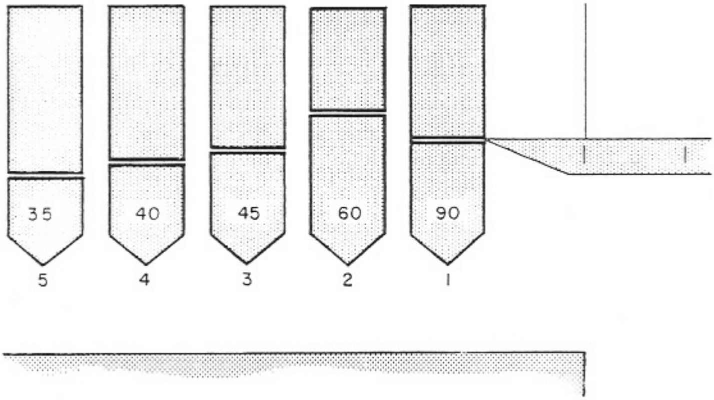


Seventh Probe for shearline, insert probe, and then read distance between the mark and outside of lock—subtract this distance from mark that is just inside of lock and you have the distance your probe has traveled.

Eighth Withdraw probe and let 2 fall free . . . (number 2 is a low pin (60)).

Ninth Since 2 is a low pin, you will not find the shearline.

Tenth Back up probe and let 1 fall free . . .



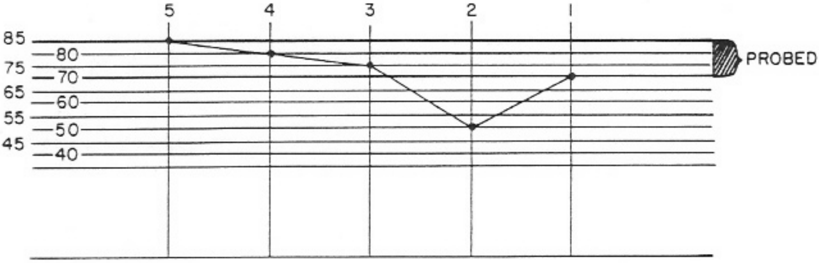
Eleventh Probe for shearline, insert probe, and read scale.

Twelfth You now have the complete pin combination; however you don't know what 2 is except that it is a low pin (deep key cut).

Now, we will drop the highs for the time being and go on to the lows, but first let's chart the above combinations.

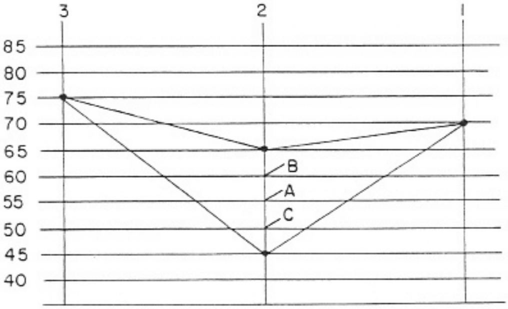
At this point, it is necessary that you accept a rule which will be explained later—

"No pin will ever be less than 2.5 mm. (25) below its neighbor pins."



Study this chart carefully even though it is INCORRECT. The reason it was drawn incorrectly is because it is the first mistake that a beginner makes in trying to dope the lows. He forgets that he has probed 2 and found no shearline, and because 1 is lower than 3, he assumes that the rule begins with 1. Actually the rule takes in the next five cut points below the probe line—65 down to 45.

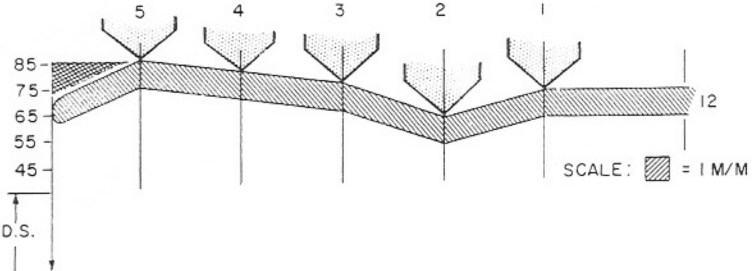
The following diagram is correct:



According to the rule, then, it is impossible for pin 2 to be below 45. It is also impossible, since 3 is cut at 75 (the highest of the two neighboring pins) for 2 to be below "A." Please notice that "A" is the mid-point of the variation, so we can successfully eliminate "C" and 2/45. This leaves us "A," "B," and 2/65 to work with—the cut point must be one of these three levels. SAK always begins with the center point, and this would be point "B" as the cut point or key cut point. The SAK System allows an error of 05 either above or below the actual cut point, and this is in agreement with the reason why SAK always begins the process of elimination from the center of the variation.

Let's assume that 2 is a 55 lower pin length instead of 60. A 55 pin would take a key cut of 65. Therefore, the process of elimination would be the same. Between 2/75 and "A" is mid-point 2/65—you could stop right here and cut your pick at 2/65, or you could do as we have done above, and cut your pick at "B"—it makes little difference because you are within 05 of the actual key cut point.

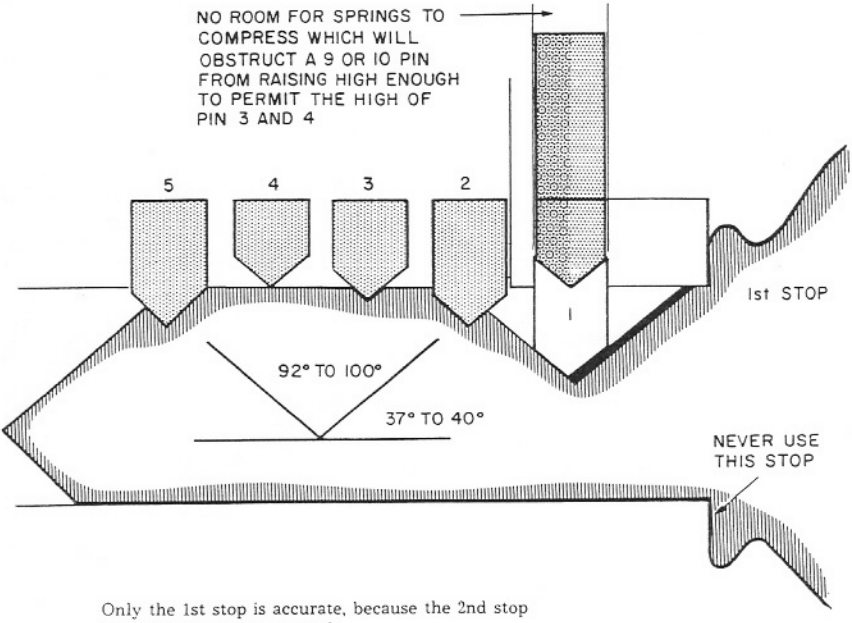
The following diagram is the pick that you would construct to open this pin combination of 5/35, 4/40, 3/45, 2/60, and 1/50:



Angle, at this end is not important; however, please notice that its 3½ mm. long. The pick width is 1.2 mm. Its thickness varies with the stock used—just keep it smooth and polished.

For the time being, we will drop "variations" even though it has not been explained to you how you determine a key combination which is made up of all "lows." However, before this can be clarified, it is essential that we discuss key angles.

Key angles are unimportant in the SAK System except in relation to number 1 pin, and this is the reason why number 1 pin will never be lower than a number 8 cut point. Since all the cutters of the machine that makes the keys, for the locks that they are to fit, are all the same size, it would be unpractical if the number 1 pin was cut to a 9 or 10 level. The cutter for a 9 or 10 cut would then cut into the part of the key that is outside of the lock, and in addition to this, a 9 or 10 cut for a number 1 pin would weaken the key to such an extent that metal fatigue would set in and the key would snap. Most all the tension that you exert upon a key to turn the lock is felt in the area from the key "stop" to the area between number 1 and 2 pins. Another reason for this is that in many cases you would have a difficult time inserting the key into the lock if the number 1 was a 9 or 10 cut level—especially if you had high at pin 3 and 4—there would not be enough room in the channel for the 9 or 10 lower pin length to ride far enough up to allow the high of pin 3 or 4.


NO ROOM FOR SPRINGS TO COMPRESS WHICH WILL OBSTRUCT A 9 OR 10 PIN FROM RAISING HIGH ENOUGH TO PERMIT THE HIGH OF PIN 3 AND 4
5
4
3
2
1
1st STOP
92° TO 100°
37° TO 40°
NEVER USE THIS STOP

Only the 1st stop is accurate, because the 2nd stop is sometimes cut at an angle.

The greater the key angle, the less number of combinations.
The smaller the key angle, the more number of combinations.

Since no pin can be less than 25 lower than its neighbor, the following table will introduce 1/10 of the possible pin combinations that can be used in 5 pin lock with 10 cut levels—the pin order will be reversed to prevent confusion:

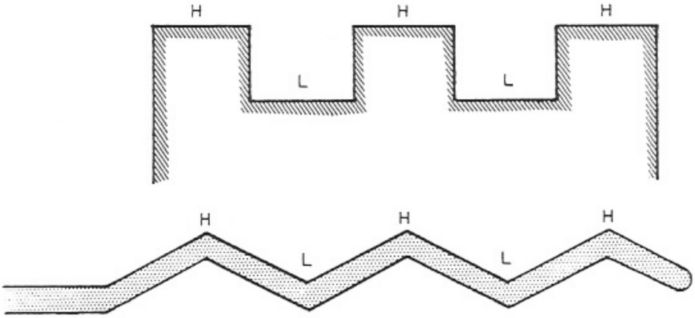
1.	2.	3.	4.	5.	4.	5.							
1	1	1	1	1 to 1	5		1	2	1	1	1 to 1	1	5
			2	1 to 2	6				1	2	1 to 1	2	6
			3	1 to 3	7				1	3	1 to 1	3	7
			4	1 to 4	8				1	4	1 to 1	4	8
			5	1 to 5	9				1	5	1 to 1	5	9
1	1	2	1	1 to 2	1	5	1	2	2	1	1 to 2	1	5
		2	2	1 to 2	2	6			2	2	1 to 2	2	6
		2	3	1 to 2	3	7			2	3	1 to 2	3	7
		2	4	1 to 2	4	8			2	4	1 to 2	4	8
		2	5	1 to 2	5	9			2	5	1 to 2	5	9
		2	6	2 to 2	6	10			2	6	2 to 2	6	10
1	1	3	1	1 to 3	1	5	1	2	3	1	1 to 3	1	5
		3	2	1 to 3	2	6			3	2	1 to 5	2	6
		3	3	1 to 3	3	7			3	3	1 to 3	3	7
		3	4	1 to 3	4	8			3	4	1 to 3	4	8
		3	5	1 to 3	5	9			3	5	1 to 3	5	9
		3	6	2 to 3	6	10			3	6	2 to 3	6	10
		3	7	3 to 3	7	10			3	7	3 to 3	7	10
1	1	4	1	1 to 4	1	5	1	2	4	1	1 to 4	1	5
		4	2	1 to 4	2	6			4	2	1 to 4	2	6
		4	3	1 to 4	3	7			4	3	1 to 4	3	7
		4	4	1 to 4	4	8			4	4	1 to 4	4	8
		4	5	1 to 4	5	9			4	5	1 to 4	5	9
		4	6	2 to 4	6	10			4	6	2 to 4	6	10
		4	7	3 to 4	7	10			4	7	3 to 4	7	10
		4	8	4 to 4	8	10			4	8	4 to 4	8	10
1	1	5	1	1 to 5	1	5	1	2	5	1	1 to 5	1	5
		5	2	1 to 5	2	6			5	2	1 to 5	2	6
		5	3	1 to 5	3	7			5	3	1 to 5	3	7
		5	4	1 to 5	4	8			5	4	1 to 5	4	8
		5	5	1 to 5	5	9			5	5	1 to 5	5	9
		5	6	2 to 5	6	10			5	6	2 to 5	6	10
		5	7	3 to 5	7	10			5	7	3 to 5	7	10
		5	8	4 to 5	8	10			5	8	4 to 5	8	10
		5	9	5 to 5	9	10			5	9	5 to 5	9	10

1	2	6	2	1 to 6	2	6
		6	3	1 to 6	3	7
		6	4	1 to 6	4	8
		6	5	1 to 6	5	9
		6	6	2 to 6	6	10
1	3	1	1	1 to 1	1	5
		1	2	1 to 1	2	6
		1	3	1 to 1	3	7
		1	4	1 to 1	4	8
		1	5	1 to 1	5	9
1	3	2	1	1 to 2	1	5
		2	2	1 to 2	2	6
		2	3	1 to 2	3	7
		2	4	1 to 2	4	8
		2	5	1 to 2	5	9
		2	6	2 to 2	6	10
1	3	3	1	1 to 3	1	5
		3	2	1 to 3	2	6
		3	3	1 to 3	3	7
		3	4	1 to 3	4	8
		3	5	1 to 3	5	9
		3	6	2 to 3	6	10
		3	7	3 to 3	7	10
1	3	4	1	1 to 4	1	5
		4	2	1 to 4	2	6
		4	3	1 to 4	3	7
		4	4	1 to 4	4	8
		4	5	1 to 4	5	9
		4	6	2 to 4	6	10
		4	7	3 to 4	7	10
		4	8	4 to 4	8	10
1	3	5	1	1 to 5	1	5
		5	2	1 to 5	2	6
		5	3	1 to 5	3	7
		5	4	1 to 5	4	8
		5	5	1 to 5	5	9
		5	6	2 to 5	6	10
		5	7	3 to 5	7	10
		5	8	4 to 5	8	10
		5	9	5 to 5	9	10
1	3	6	2	1 to 6	2	6
		6	3	1 to 6	3	7
		6	4	1 to 6	4	8
		6	5	1 to 6	5	9
		6	6	2 to 6	6	10
		6	7	3 to 6	7	10
		6	8	4 to 6	8	10
		6	9	5 to 6	9	10
1	3	7	3	1 to 7	3	7
			4	1 to	4	8
			4	1 to	4	8
			5	1 to	5	9
			6	2 to	6	10
			7	3 to	7	10
			8	4 to	8	10
			9	5 to	9	10
1	4	1	1	1 to 1	1	5
			2	1 to	2	6
			3	1 to	3	7
			4	1 to	4	8
			5	1 to	5	9
1	4	2	1	1 to 2	1	5
			2	1 to	2	6
			3	1 to	3	7
			4	1 to	4	8
			5	1 to	5	9
			6	2 to	6	10
1	4	3	1	1 to 3	1	5
			2	1 to	2	6
			3	1 to	3	7
			4	1 to	4	8
			5	1 to	5	9
			6	2 to	6	10
			7	3 to	7	10
1	4	4	1	1 to 4	1	5
			2	1 to	2	6
			3	1 to	3	7
			4	1 to	4	8
			5	1 to	5	9
			6	2 to	6	10
			7	3 to	7	10
			8	4 to	8	10
1	4	5	1	1 to 5	1	5
			2	1 to	2	6
			3	1 to	3	7
			4	1 to	4	8
			5	1 to	5	9
			6	2 to	6	10
			7	3 to	7	10
			8	4 to	8	10
			9	5 to	9	10
1	4	6	2	1 to 6	2	6
			3	1 to	3	7
			4	1 to	4	8
			5	1 to	5	9
			6	2 to	6	10
			7	3 to	7	10
			8	4 to	8	10
			9	5 to	9	10
			10	6 to	10	10

1	4	7	3	1	to 7	3	7
			4	1	to	4	8
			5	1	to	5	9
			6	2	to	6	10
			7	3	to	7	10
			8	4	to	8	10
			9	5	to	9	10
			10	6	to	10	10
1	4	8	4	1	to 8	4	8
			5	1	to	5	9
			6	2	to	6	10
			7	3	to	7	10
			8	4	to	8	10
			9	5	to	9	10
			10	6	to	10	10
1	5	1	1	1	to 1	1	5
			2	1	to	2	6
			3	1	to	3	7
			4	1	to	4	8
			5	1	to	5	9
1	5	2	1	1	to 2	1	5
			2	1	to	2	6
			3	1	to	3	7
			4	1	to	4	8
			5	1	to	5	9
			6	2	to	6	10
1	5	3	1	1	to 3	1	5
			2	1	to	2	6
			3	1	to	3	7
			4	1	to	4	8
			5	1	to	5	9
			6	2	to	6	10
			7	3	to	7	10
1	5	4	1	1	to 4	1	5
			2	1	to	2	6
			3	1	to	3	7
			4	1	to	4	8
			5	1	to	5	9
			6	2	to	6	10
			7	3	to	7	10
			8	4	to	8	10
1	5	5	1	1	to 5	1	5
			2	1	to	2	6
			3	1	to	3	7
			4	1	to	4	8
			5	1	to	5	9
1	5	5	6	2	to 5	6	10
			7	3	to	7	10
			8	4	to	8	10
			9	5	to	9	10
1	5	6	2	1	to 6	2	6
			3	1	to	3	7
			4	1	to	4	8
			5	1	to	5	9
			6	2	to	6	10
			7	3	to	7	10
			8	4	to	8	10
			9	5	to	9	10
			10	6	to	10	10
1	5	7	3	1	to 7	3	7
			4	1	to	4	8
			5	1	to	5	9
			6	2	to	6	10
			7	3	to	7	10
			8	4	to	8	10
			9	5	to	9	10
			10	6	to	10	10
1	5	8	4	1	to 8	4	8
			5	1	to	5	9
			6	2	to	6	10
			7	3	to	7	10
			8	4	to	8	10
			9	5	to	9	10
			10	6	to	10	10
1	5	9	5	1	to 9	5	9
			6	2	to	6	10
			7	3	to	7	10
			8	4	to	8	10
			9	5	to	9	10
			10	6	to	10	10

continuing on to numbers
8 10 10 10 10

Let's examine the relationship between the SAK System for the Chubb 5 lever lock and the pin tumbler lock. The following diagram shows this relationship, and the table below the diagram is Basic Designs for pin tumbler picks:



1	1	1	1	1	2	1	1	1	1
1	1	1	1	2	2	1	1	1	2
1	1	1	2	1	2	1	1	2	1
1	1	1	2	2	2	1	1	2	2
1	1	2	1	1	2	1	2	1	1
1	1	2	1	2	2	1	2	1	2
1	1	2	2	1	2	1	2	2	1
1	1	2	2	2	2	1	2	2	2
1	2	1	1	1	2	2	1	1	1
1	2	1	1	2	2	2	1	1	2
1	2	1	2	1	2	2	1	2	1
1	2	1	2	2	2	2	1	2	2
1	2	2	1	1	2	2	2	1	1
1	2	2	1	2	2	2	2	1	2
1	2	2	2	1	2	2	2	2	1
1	2	2	2	2	2	2	2	2	2

1 represents high
2 represents low . . .

Depths should be 2 mm. . . .

A key with a pattern of 1 5 3 4 8
would take basic design 1 2 1 2 2

A key with a pattern of 8 10 6 8 7
would take basic design 1 2 1 2 1

According to SAK, 3 known points will produce a good pick and you will be able to open a lock, mushroom pins or not, in less than 30 seconds with practice. Two known points will produce a fair pick, and opening time will be from 30 seconds to 2 minutes. Only 1 known point will give a poor pick since your deep cuts are mostly estimated. Here, opening time will be from 2 to 4 minutes—anything longer than four minutes is an indication of wrong estimates in the deep cut pattern and the pick should be re-constructed.

Now, just one more point before we can go into the estimation of an all low pattern. You have probed and determined that all the pins are lows. Where do you begin from to estimate your low pattern? With the aid of an original factory blank of the lock you wish to pick, you can determine what the length of the number 1 pin is. The method described herein can be used to determine the lengths of the other pins also, but not in all cases; however, it usually works for number 1 pin.

First — Insert your factory original blank halfway into the keyhole between the outside of the lock and the number 1 pin.

Second — Apply pressure in the direction that the lock opens although in some locks you can use both sides.

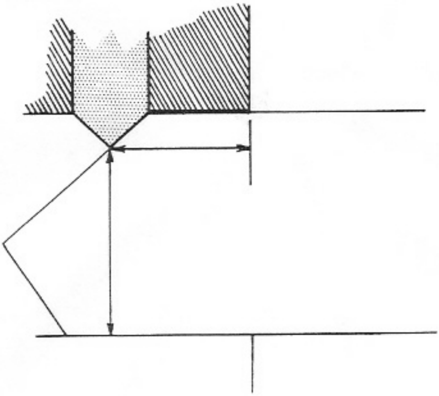
Third — Keeping the same amount of side pressure, insert the blank into the lock until it begins to move the number 1 pin upward towards the shearline.

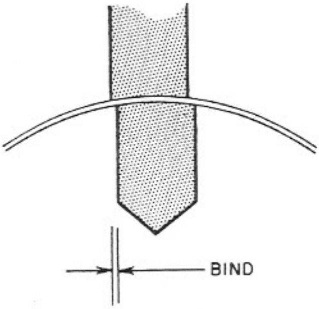
Fourth — Maintaining your steady side pressure, press the blank in securely under number 1 pin—the blank should lock if it's in the correct position because you have driven number 1 pin up to the shearline, and this will prevent the key from going on past the number 1 pin.

Fifth — Draw a line on the blank right up against the face of the lock.

Sixth — Extract the blank, and, using your calipers, measure 55 (5.5 mm.) from the mark on the blank towards the lead key angle. (Remember that you must determine what length to use my measuring this distance on the locks that you have dismantled and studied.)

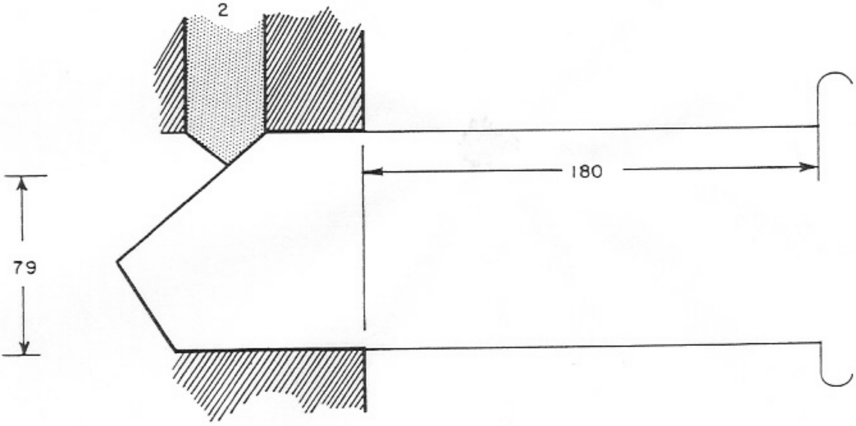
Seventh — Since this distance is the distance from the outside of the outside of the lock to the center of pin number 1, the point of contact of 55 with the lead key angle will give you the correct *key cut height*—subtracting this distance from the height of the shearline will give you the lower pin length, and you have a starting point for your low estimation.



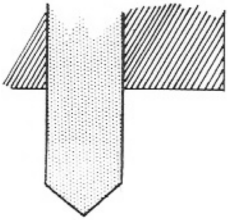


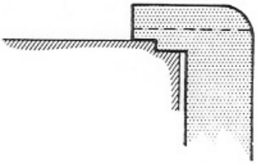
And now, another method for determining the lower pin length of lows in which an original factory blank is also used. The following reckoning is for a Zeus lock, and side pressure is used once again but the measurements are in reverse:

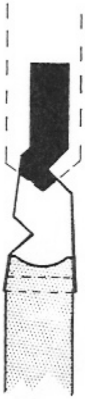
1.	84	175	High
2.	79	180	High
3.	74	185	High
4.	69	190	
5.	64	195	
6.	59	200	
7.	54	205	
8.	49	210	
8.	49	210	
9.	44	215	
10.	39	220	



The SAK System of tension is different from the American style of tension in that it has no spring to it like the American style. The tension bar is constructed out of 3 mm. stock, and is cut to fit very tightly into the base of the keyhole. After it is finished, it is heated to a red glow and immersed into water which is 63 degrees. SAK carries in his kit approximately 5 tension bars for each profile and each bar of the same type is 1/10 wider than the others. The writer believes that the American style of tension is better for surreptitious work because it is faster, and leaves no marks while the SAK tension bar must be fitted to precision, and leaves marks in the casings of some locks. However, the SAK tension bar is the better of the two, and you will be surprised at the amount of feel that you can receive with this bar. Naturally, you can construct the bar to any length or shape except for the part that fits into the lock.



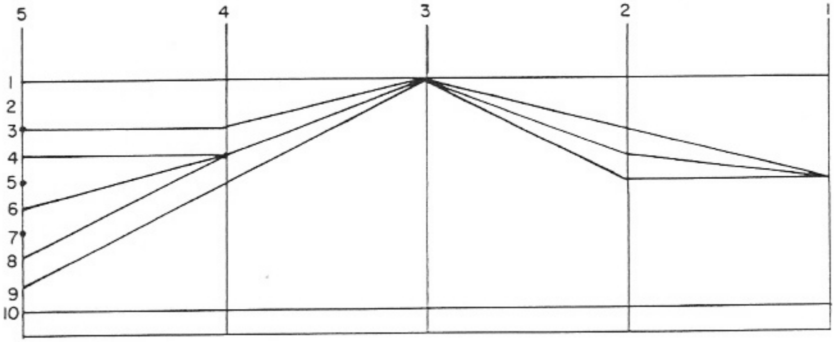




NOT TO SCALE

To test for correctness, after you have inserted the bar, grasp the bar firmly and move it up and down and back and forth. If the plug moves freely and the bar remains in its position, you have the bar in its correct position. What you want to accomplish is to make the bar and plug as *one*.

At this point, let's go back to the "variations" of lows. Let's assume that we have probed a lock and found a high in the 3rd pin. Since all the other pins are lows, we have used one of the two methods indicated to find our lower pin length of number 1 pin which is reckoned to be a 5—therefore, we would construct 3 picks or cut 25 keys, as follows:

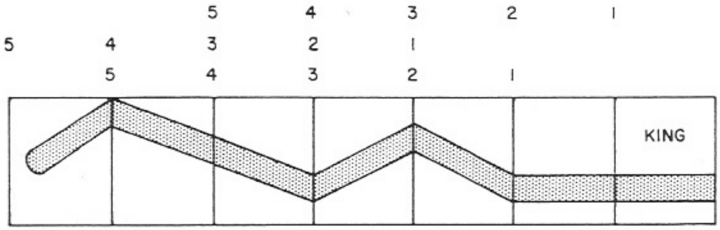


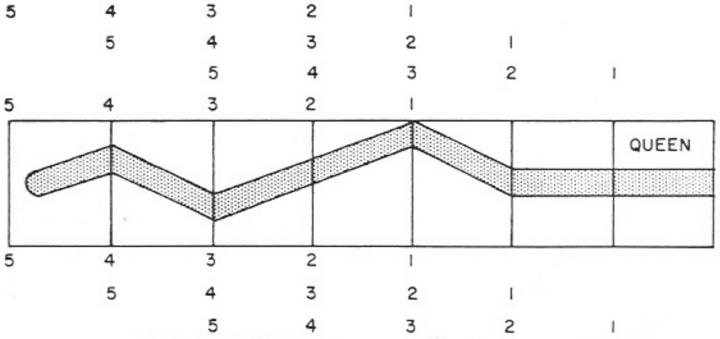
To explain this chart, we will begin with the number 3 pin which we have probed as a #1—this is your point of departure since it's the highest of your two known points. From 3/1 to 2/5 is the farthest that 2 can possibly be—so, 2/5 is the limit of your variation downward. Your variation upward cannot be more than 2/3 since we probed 2/1 and 2/2 and found nothing there (the limit of our probing in this example is 1 and 2). 2/4 is your mid-point, and in all probability with a 5 at 1 and a 1 at 3, your 2 will be 2/4 if you probe no cuts at 1 and 2 levels in number 2 pin.

With pin number 4, the variation is the same as number 2 pin, and should cause no difficulty.

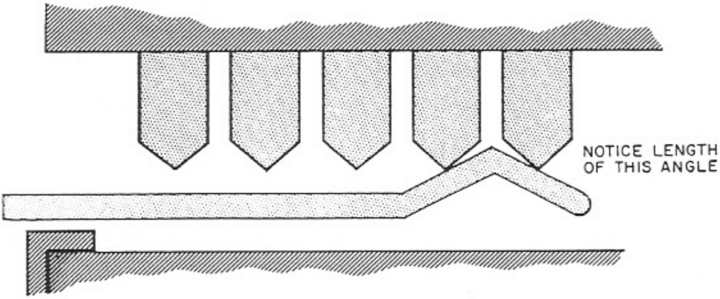
Number 5 pin is a study within itself, and we will begin with 5/3—we have probed 5/1 and 5/2 and found nothing, so we can begin our variation with 5/3 which is the highest that 5 can be—your lowest point for 5 can not be more than a 9 since the lowest point in pin 4 is a 5 level—now we have established our extreme high level and low level for pin 5—go back to the mid-point of pin 4—4/4—putting the rule into effect in respect to pin 5, our variation from 4/4 will be 5/4 to 5/8—our mid-point is now 5/6, and your variation is completed since 5/5 and 5/7 are within 05 mm. margin of allowed error.

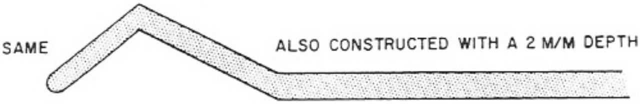
It is with great pride that SAK introduces a student to his "KING" and "QUEEN"—the two picks that will, he claims, open 60 percent of all locks. The following diagram is drawn to scale, and also indicates how the 2 picks can be used:

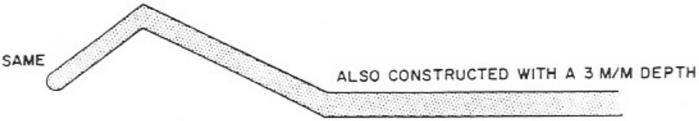


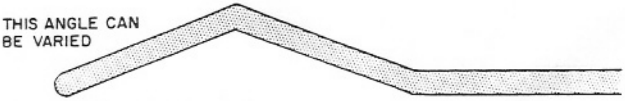


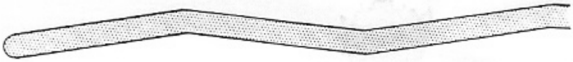
The following diagrams are other "standard" picks that can be constructed and used without probing—they are used mostly with very simple and inexpensive pin tumbler locks:

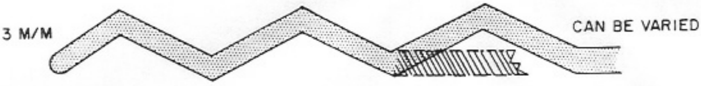

NOTICE LENGTH
OF THIS ANGLE

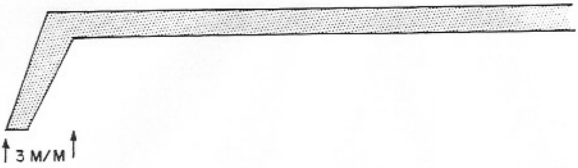

SAME
ALSO CONSTRUCTED WITH A 2 M/M DEPTH


SAME
ALSO CONSTRUCTED WITH A 3 M/M DEPTH

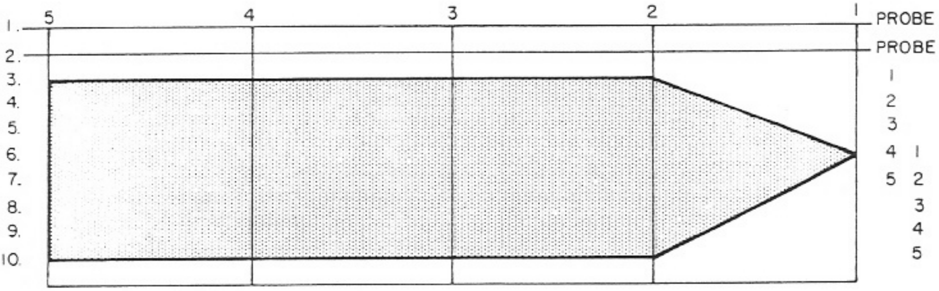

THIS ANGLE CAN
BE VARIED



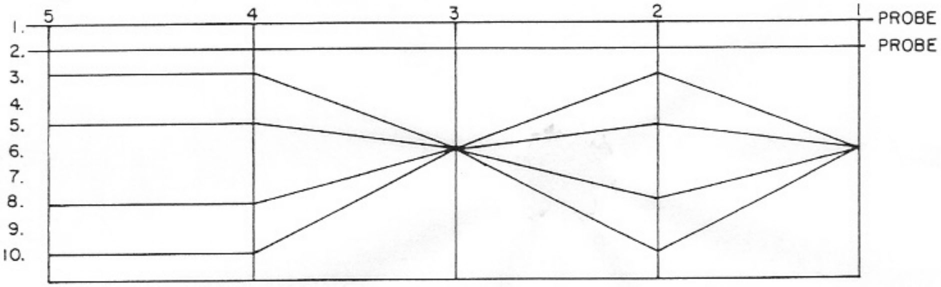

3 M/M
CAN BE VARIED


3 M/M

You now know how to figure variations with highs and lows, plus two methods for determining the lows of a pin combination. Let's take the pin combination of 5/5, 4/4, 3/6, 2/8, 1/6 and assume that we have definitely determined the number 1 pin at 6—here's what your variations would be charted as follows:



The variation as you see it would give you approximately 50 picks and 500 keys which would be of little help to us—so—you must determine at least 2 pin levels or lengths. The following diagram is correct for the above pin combination IF we could determine pin 3 which is easy to do with the two methods previously indicated:



SCALE: ▨ = 1 M/M

This variation gives you 4 picks and 25 keys.

THE HELASON LOCK

According to SAK, the Helason is one of the best locks made in Europe today that is used by the householder. It is so well constructed that its tolerances can be accurately measured as 01—no more nor less. It has a possible total pin combination of 64,000.

The ten to twelve tools that were purchased by this Region from SAK for the Helason lock are now obsolete since Bierhaus has now invented a new method which takes approximately 4 minutes to open the Helason through its 4 positions. This new method comprises a measuring device and a key which can be assembled as the measurements are taken. Because of this latest invention by SAK and because the writer hopes that at least one of these tools will be purchased by our organization, the tools now in possession of this Region will not be described.

The Helason comprises two types—old and new—they can be readily distinguished. The new Helason has a nickel plated cover over the front of the lock with the words Helason stamped over and under the keyhole—the lock turns within this plate. The old are of two types—Brass front is pre-1936 and is not the easiest to pick since it was well constructed of good materials; however, the Helason made during the 1936 to 1946 period has a lead front and has many tolerances and mistakes in construction.

The Helason has 16 pins in 4 banks of 4 pins each—they are situated at 12, 3, 6, and 9 o'clock.

It has only 2 pin levels—high and low.

All pins are 25 in diameter, and 50 from center to center.

The distance from one pin to its opposite is 25.

All pins contact the shaft in the center of the keyhole.

The distance from the center of the lock to the shearline is 70.

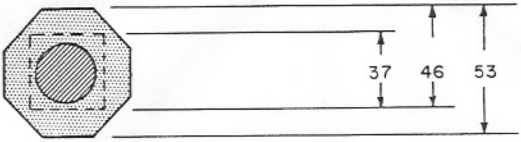
The distance from the outside of the lock to the center of the first pin is 10 mm.

The distance from the outside edge to the plug is 33.

The distance from the outside to the front edge of the keyhole shaft is 66.

From high to high is 53 to 54—old and new.
From low to low is 37 —old and new.
From high to low is 46 —old and new.

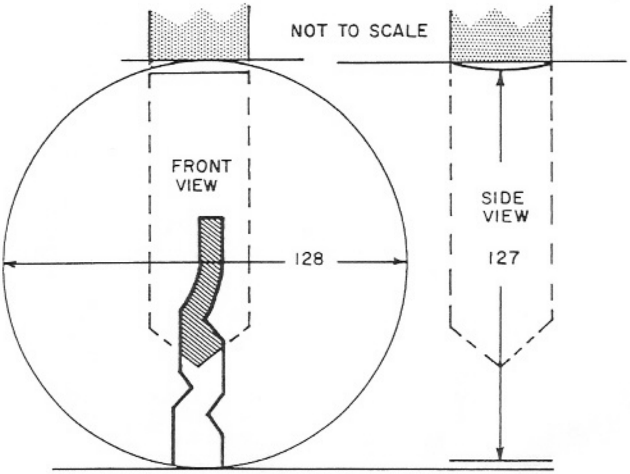
The old Helasons are 40 from the center of one pin to the other.



TOLERANCES

According to SAK, there are five tolerances which come from the plug, pins, key (including the keyhole), usage, and the tolerances that the manufacturer put in his product to insure its operation.

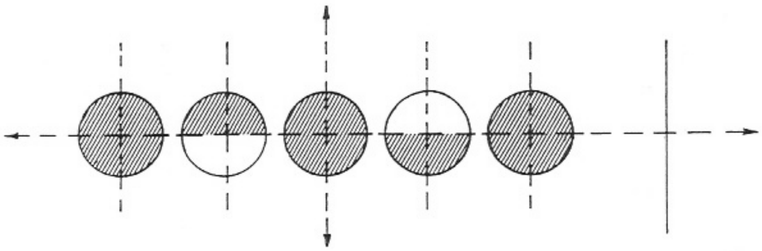
Many chapters can be written about the tolerances within a lock — so, we will discuss only the tolerances that appear to be most important. The following figures are not to be construed as being accurate, but the points in question that these figures are to represent will be accurate. Let's take the plug first:



From blue to blue is your actual measurement for the relationship between key and lower pin length. Naturally, not all locks have these two tolerances, but they should be apparent in most European locks and many inexpensive American locks. When you break a lock down for study, establish this distance as accurately as possible, because it is the basis of the SAK System for determining the key cut levels and lower pin lengths of any manufacturer.

The Evva lock has a plug diameter of 12.8 (128)—however, from blue to blue, the Evva is 127 and the lock body is 130 or an imposed tolerance of 3-tenths of a mm.

And now, a tolerance that comes from production methods, and which is important in using the side pressure with the factory blank key. As each plug is drilled for the channels in which the pins will set, they are intended to be drilled in a straight line; however, 1 or 2 of the channels will be off center and this makes it easier to use the side pressure method by applying your pressure against the short side—as follows:



As the writer understood his instruction from SAK, tolerances are not a difficulty as long as the different types of tolerances are known to the operator. According to SAK, a good lock should not have more than 05 tolerances of any one kind.

MUSHROOM PINS

Using the SAK picks against mushroom pins makes for a much easier pick of the lock than any other system known to the writer. Upon trying to pick a mushroom pin lock, insert your pick and drive all the pins down even before you apply pressure upon your tension bar—when you have all the pins pushed into the channels, slowly increase your tension as you work your pick back and forth and up and down in a figure eight motion—take it easy—do not work too fast. If after one minute of work the lock does not give, begin again, but this time after driving the pins into the channels, use more pressure to begin with. A 5 pin 3 mushroom lock should give (with the correct pick) after 2 to 3 minutes of work.